THERMOPHYSICAL PROPERTY DATABASE OF LIQUIDS AND GASES

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This short report is devoted to memory of a well-known Russian Professor, Dr. of Technical Sciences, Vargaftic N.B. He died in June, 1994, at the age of 90. Natan Borisovich had kept long-term business and personal contacts with many world- wide known scientists – physicists. He met with J.O. Hirschfelder, F.Y. Keyes and J. Kestin, whose works he evaluated very high. Natan Borisovich was on friendly terms with Y.S. Touloukian who wrote a very warm foreword to an American edition of Natan Borisovich's Handbook of Physical Properties of Liquids and Gases.Pure Substances and Mixtures.

N.B. Vargaftic was a member of a Scientific Council on Thermophysics and Thermal Energy of Russian Academy of Sciences, Honoured member of International Association on water and water vapour properties. He wrote books in the field of thermophysical properties of substances. He prepared 30 Candidates and 4 Drs. of Sciences.

Thermophysical Property Database developed by the authors is based on Handbook of Physical Properties of Liquids and Gases by N.B. Vargaftic, Yu.K. Vinogradov and V.S. Yargin, which was published by Begell House Inc., USA, in 1996 and it is the third Augmented and Revised Edition of N.B. Vargaftic's well-known handbook. HPLG relational database is developed on the Visual FoxPro 5.0 base for Windows 95, providing full integration into the family of applied Microsoft and allows to efficiently extract the reference material of the user's concern from the computer's memory and apply different services to work with it.

These services, first and foremost, include effective search of the substance and its thermophysical properties demanded by the user, as well as sampling selection organization by a single or several criteria from the table data. These procedures are performed by Visual FoxPro 5.0 means for Windows 95 and SQL language.

A service of thermophysical property table value interpolation has been developed, since the tables are usually given by the authors for round temperature and pressure values, which is not always good for the users. Newton's interpolation formula is used for five non-equidistant argument values. The service allows to calculate an interpolation error by a residual term value, which is especially important, as the values obtained by interpolation in the field of dramatic thermophysical property change (e.g., in the field of phase transfer or critical area) may prove to be unreliable. Two-argument – temperature and pressure – interpolation ability is provided for. In this case a process is effected sequentially: first, temperature interpolation is performed and then the values obtained at the first step under every pressure are interpolated by pressure. In both cases an interpolation error is calculated, which, of course, is of an estimating character.

The database also uses a service of representing the table data by thermophysical properties in different system units. The user, after opening the Units menu, can choose the

measurement units of this or that thermophysical property of the subs tance. For instance, the service enables to represent temperature in K, ^{0}C or ^{0}F; for pressure the following is provided: bar, Mpa; atm; lbf/ft^2 ; lbf/in^2 ; mm Hg; for thermal unit W, J, cal (IT), cal, BTU are used; for density – kg/m^3 , lbm/ft^3 , lbm/in^3 , lbm/gal, etc.

HPLG database service can comprise that of working with references. This is an effective search and output of references applied for particular table construction onto the computer's display. Sampling selection organization from a full or a particular list of references by a single or a few parameters is provided for.

The description service gives brief descriptions of substances used in each particular group, table comments, approximation and other equations and coefficient values of these equations, as well as the most typical graphs of thermophysical properties and their errors.

This database is demonstrated today at this 14th Symposium. We should be very glad to discuss its disadvantages and advantages with the colleagues.